

**Department of Local Government, Punjab,**  
SCO No.131-132, Sector 17-C, Chandigarh

To

1. All Commissioners,  
Municipal Corporations in Punjab
2. Regional Deputy Directors,  
Urban Local Bodies, Punjab

Memo.No.EIC-13-  
Dated 3 Apr 2013

Sub: Use of interlocking tiles

1. This is further to this office letter No. \_\_\_\_\_ dated 2<sup>nd</sup> April 2013 on the above subject.
2. The interlocking paver tiles have been in use for the last one decade in various parts of the country. The Indian Road Congress issued detailed guidelines for interlocking concrete block paver tiles in 2004. Subsequently, the Bureau of Indian Standards also issued the IS Code of pre-cast concrete blocks for paving - specifications issued vide Code No.IS:15658:2006.
3. In Punjab particularly in Municipal Corporations/Committees/Nagar Panchayats, initially paver blocks/interlocking tiles of specifications M-15/M-20 of concrete mix of 1:2:4/1:1½:3 respectively were being used before the issue of above guidelines. However, based on IS specifications and IRC code, lot of reputed manufacturers started manufacturing these tiles. In the last six years, several roads, streets, footpaths have been constructed using paver tiles. However, it is noticed that in the last 2-3 years, lot of spurious manufacturers have started putting mini plants and manufacturing non-standardized interlocking/paver tiles in various cities and towns of the State. This has led to deterioration in the quality, strength and durability of paver tiles. This led to issuance of instructions in compliance with decision taken in the meeting held under the chairmanship of the Hon'ble Deputy Chief Minister, Punjab on 22.10.2012. Directions were issued under paragraph 5 "interlocking tiles may not be used for

paving of streets in villages/Municipal Towns since they tend to break very easily” based on which a letter was issued by the Engineer-in-Chief, Local Government Department vide Memo.No.7144 dated 22.11.2012 banning use of interlocking tiles in streets/roads.

4. A number of representations were received from various Municipal Corporations/Committees/Nagar Panchayats on the above directions. However, based on the directions, all work being undertaken with paver tiles was stopped/revised to other specifications such as concrete road/black top roads.

5. A Technical committee consisting of Maj.Gen.VK Bhatt, Technical Adviser to the Chief Minister, Punjab, Sh.Manmohan Singh, Engineer-in-Chief Engineer, Department of Local Government was constituted by the Principal Secretary, Department of Local Government. The Technical Committee has studied in detail the IRC guidelines 2004, IS Code 2006, CSR provisions 2010 and American Paver System Master Specifications policy. Some of the details are specified below:

(a) **ADVANTAGES**

- (i) Since the blocks are prepared in the factory, they are of very high quality, thus avoiding the difficulties encountered in quality control in the field.
- (ii) Concrete block pavements restrict the speed of vehicles to about 60km/hr which is an advantage in city streets and intersections.
- (iii) Because of the rough surface, these pavements are skid-resistant.
- (iv) The block pavements are ideal for intersections where speeds have to be restricted and concerning stresses are high.
- (v) The digging and reinstatement of trenches for repairs to utilities is easier in the case of block pavement.
- (vi) These pavements are unaffected by the spillage of oil from vehicles, and are ideal for bus stops, bus depots and parking areas.

- (vii) They are preferred in heavily loaded areas like container depots and ports as they can be very well designed to withstand the high stresses induced there.
- (viii) In India, the laying of concrete blocks pavements can be achieved at a low cost because of the availability of cheap labour
- (ix) Since the concrete blocks are grey in colour, they reflect light better than the black bituminous pavements, thus bringing down the cost of street lighting.
- (x) The cost of maintenance is much lower than a bituminous surface.
- (xi) Block pavement does not need in-situ curing and so can be opened to traffic soon after completion of construction.
- (xii) Construction of block pavement is simple and labour intensive and can be done using simple compaction equipment.
- (xiii) Maintenance of block pavement is simple and easy. Also the need for frequency of maintenance is low as compared to bituminous pavement.
- (xiv) Structurally round blocks can be recycled many times over.
- (xv) Unlike concrete pavements, block pavement does not exhibit very deterioratory effect due to thermal expansion and contraction and are free from the cracking phenomenon.
- (xvi) Use of permeable block pavement in cities and towns can help replenish depleting underground sources of water, filter pollutants before they reach open water sources help reduce storm water runoff and decrease the quantum of drainage structures.

(b) **LIMITATIONS**

- (i) Concrete block pavements cannot be used for high speed facilities.
- (ii) The riding quality is reasonably good for low speed traffic but is inferior to that observed on a machine laid bituminous or concrete pavement.
- (iii) The noise generation is high. 5-8DB (A) higher than bituminous surfaces.

- (iv) A very good attention to pavement drainage is needed because the water can seep through the joints.

(c) **RECOMMENDED GRADES OF PAVER BLOCKS FOR DIFFERENT TRAFFIC CATEGORIES**

Sl. No.	Grade designation of Paver blocks	Specified Compressive Strength of paver blocks at 28 days N/mm <sup>3</sup>	Traffic category	Recommended minimum paver block thickness mm	Traffic example of applications
1.	2.	3.	4.	5.	6.
(i)	M-30	30	Non-traffic	50	Building premises, monument premises, landscapes, public gardens/parks, domestic drives, paths and patios, embankment slopes, sand stabilizing area etc.
(ii)	M-35	35	Light traffic	60	Pedestrian plazas, shopping complex, ramps, car parks, office driveways, housing colonies, office complexes, rural road with low volume traffic, farm house, beach sites, residential roads etc.

Notes

1. Non-traffic areas are defined as areas where no vehicular traffic occurs.
2. Light traffic is defined as a daily traffic up to 150 commercial vehicles exceeding 30 kN laden weight, or an equivalent up to 0.5 million standard axles (MSA) for a design life of 20 years (A standard axle is defined as a single axle load 81.6 kN).

(d) **CONSTRUCTION (PROPER LAYING)**

- (i) General - The construction of block pavement involves preparation of sub-grade, sub-base and base course layers, bedding sand and finally the laying of blocks. The block paving can be done entirely by manual labour. However, for efficient construction work, the work force has to be properly trained for this specialized job. Paving can also be done by mechanical means.
- (ii) Preparation of sub-grade: This is the foundation layer on which the block pavement is constructed. Like in conventional pavements the water table should be at a minimum depth of 600mm below the sub-grade. Sub-grade should be compacted in layers of 150 or 100mm thickness as per IRC:36-1970. The

prepared sub-grade should be graded and trimmed of  $\pm 20$ mm of the design levels, and its surface evenness should have a tolerance of within 15mm under a 3m straight edge.

- (iii) Base and Sub-base course: Base and sub-base courses are constructed in accordance with standard procedures contained in the relevant IRC specifications, like IRC:37-2001, IRC:50-1973, IRC:51-1993, IRC:63-1976, IRC:19-1977. When cement bound base are proposed, it may be constructed using rolled lean concrete as per IRC:SP-49. The quality control specified in IRC-SP-11 shall apply. Constructing the layers to proper level grade is very essential to maintain the level and surface regularity of the block pavement. Normally lean concrete of 1:4:8 or 1:5:10 mix should be used.
- (iv) Placing & Screeding of Bedding sand: The thickness of the sand bed after compaction should be in the range of 20-40mm, whereas, in the loose form it can be 25 to 50mm. It is preferable to restrict the compacted thickness to 20-25mm to reduce the risk of any localized pre-compaction, which would affect the final block surface level. Bedding sand should not be used to fill up local depressions should be repaired in advance before placing sand.

Sand to be used should be uniformly in loose condition and should have uniform moisture content. Best moisture content is that when sand is neither too wet nor too dry and have a value of 6 to 8 per cent. Requirement of sand for a day's work should be prepared and stored in advance and covered with tarpaulin or polythene sheets.

The processed sand is spread with the help of screed boards are provided with nails at 2-3 m apart which when dragged gives the desired thickness. The length of nail should take into account the surcharge to be provided in the uncompacted thickness. Alternatively, the screed can be dragged on edge strips kept on both sides as guide. Asphalt paver can be employed in large projects. The sand is subsequently compacted with plate vibrators weighing 0.6 tonnes or more level checks shall be carried out on a grid pattern to establish that the desired level is achieved. Local correction can be done either by removing or adding extra sand followed by leveling and compacting the layer. There will be some settlement of sand after the blocks are placed and compacted, which must be allowed for, while fixing the level of sand bed.

The effect of undulating surface of base or sub-base on the profile of block pavements is explained in Fig.12. The blocks will settle after trafficking in such a manner that the surface profile becomes parallel to base/sub-base profile. Sand bed assumes uniform thickness under moving loads.

- (v) Laying of blocks: Blocks can be laid generally by manual labour but mechanical aids like hand-pushed trolleys can expedite the work.

Normally, laying should commence from the edge strip and proceed towards the inner side. When dentate blocks are used, the laying done at two fronts will create problem for matching joints in the middle. Hence, as far as possible, laying should proceed in one direction only, along the entire width of the area to be paved.

While locating the starting line, the following should be considered:

- On a sloping site, start from the lowest point and proceed uphill on a continuous basis, to avoid down-hill creep in incomplete areas.
- In case of irregular shaped edge restraints or strip, it is better to start from straight string line as shown in Fig.13.
- Influence of alignment of edge restraints on achieving and maintaining laying bond

(e) MOCK-UPS

- i. Prior to starting the work, a 10ftX10ft area shall be installed.
- ii. This area will be used to determine surcharge of the bedding sand layer, joint sizes, lines, laying pattern(s) and the color(s) and texture of the pavers to be used on the project.
- iii. This area shall be standard from which the work will be judged and shall be left undisturbed until the work is completed. Whenever possible, it shall be incorporated as part of the work.

(f) QUALITY CONTROL

- (i) After removal of excess sand, check final elevations for conformance to the drawings.
- (ii) Remove pavers that are loose, chipped, broken, stained or otherwise damaged, with fresh units and re-set units that do not match adjoining units. Provide new units to match

adjoining units and install in same manner as original units with same joint treatment to eliminate evidence of replacement.

- (iii) Clean exposed surfaces with potable water and stiff fiber brushes until all dirt, stains, efflorescence, asphalt and other blemishes are removed. Use cleaner and procedures recommended by paver manufacturer. Test small sample areas for acceptance of cleaning procedures. Do not use wire brushes, metal scrapers or acids. Protect adjacent surface from damage during cleaning and operations.
- (iv) After cleaning, examine work and repair unacceptable conditions and correct as required.
- (v) After installation and cleaning, protect work from damage during subsequent construction activities until work is accepted.

#### **QUALITY ASSURANCE**

- i. Installation shall be by a contractor and crew with at least five years experience in placing interlocking concrete pavers on projects of similar size and scope.
- ii. Contractor shall conform to all local, state/provincial licensing and bonding requirements and shall hold or have received training according.
- iii. Only tiles BIS approved manufacturers and ISI marked paver tiles will be incorporated in all future works.

#### **(g) FIELD/LABORATORY TESTS**

- (a) Manufacturers test report and inspection of factory before approving sample of paver tiles.
- (b) Necessary field/laboratory tests shall be carried out by the contractor while executing the work at his own cost.
- (c) The field/laboratory tests will be conducted in an Engineering College/approved technical institution as directed by the Engineer to authenticate quality.

5. The concrete interlocking paver tiles are initially allowed to be used in footpaths, streets with light traffic, garden paths and cycle tracks based on above guidelines, specifications and quality control measures. Also all works in progress (partly completed) should be finished with paver tiles,

maintaining the quality so as to avoid ugly look and provide equal satisfaction to general public/residents.

6. All ULBs will ensure that contractors selected for executing these should have previous experience in the interlocking tile work. All contracts should include one year warranty period from the date of completion and additional four years Annual Maintenance should be part of the same contract agreement.

7. The Engineer-in-Charge will be fully responsible for the compliance of the above guidelines. Moreover, the Superintending Engineer and the Chief Engineer of that area/ULBs will ensure implementation of these guidelines. The Municipal Commissioners/Executive Officers will ensure that periodical inspections by the Superintending Engineers/Chief Engineers are organized.

8. This letter supersedes all previous instructions/policy letters issued on this subject. These instructions be brought to the notice of all concerned.

Engineer-in-Chief

Endst.No.EIC-13-

Dated 03.04.2013

A copy of the above is forwarded to:

- (a) Maj.Gen.V.K.Bhatt, Technical Adviser to Hon'ble Chief Minister, Punjab
- (b) PS to PSLG for kind information of Principal Secretary Local Government, Punjab.
- (c) PA to DLG for kind information of Director Local Government Punjab.

Engineer-in-Chief